CLAIMS:

We claim:

1. An overmolding insert, comprising:

a base having at least one opening in a first surface, said opening being in communication with a second surface opposite said first surface,

at least one hollow projection extending from said first surface of said base, said hollow projection having a first opening in communication with the opening of said first surface and a second opening located at a terminal portion of said hollow projection,

said insert further comprising two opposed side walls, each side wall being joined to said first surface, two opposed end walls being joined to an opposite end of said first surface and extending from one side wall to the other side wall, such that the side walls, the end walls, and the first surface define a partially closed space,

with the proviso that said terminal portion of said hollow projection extends beyond said partially closed space.

2. The overmolding insert of claim 1, wherein said insert comprises a polymeric material.

3. The overmolding insert of claim 1, wherein said insert comprises a thermoplastic material.

4. The overmolding insert of claim 3, wherein said thermoplastic material comprises a glass fiber reinforced polymeric material.

5. The overmolding insert of claim 1,

wherein said side walls and said end walls each have a terminal segment located opposite to where said side walls and said end walls join to said first surface, and

wherein said terminal segment is capable of being raised to a higher temperature upon being contacted with molten polymer than a remainder of said insert.

6. The overmolding insert of claim 1, wherein a thickness of said base is the same thickness as a thickness of said terminal segment.

7. The overmolding insert of claim 1, further comprising at least one abutment extending from said first surface which is effective to reduce a volume of said partially closed space.

8. The overmolding insert of claim 1, wherein corners formed by said side walls and said base opposite said first surface are either chamfered or rounded.

9. The overmolding insert of claim 1, further comprising a taper adjacent said second opening of said terminal portion of said hollow projection.

10. The overmolding insert of claim 1, wherein said hollow projection has a step having a greater perimeter than an outside perimeter of said hollow projection, said step having the same shape as said hollow projection.

11. The overmolding insert of claim 1, wherein said hollow projection has a cylindrical shape.

12. The overmolding insert of claim 1, further comprising a plurality of hollow projections which are coplanar and spaced along a longitudinal axis of said base.

13. A heat exchanger, comprising

a plurality of hollow conduits each having a first end and a second end;

a first manifold having an internal space, said first manifold connected to said first end of each conduit such that said hollow conduit is in communication with said internal space;

a second manifold connected to said second end of each conduit;

wherein at least one of said first and second manifolds is joined around said conduit ends and at least one overmolding insert of claim 1 such that a hollow conduit is fitted over a hollow projection.

14. The heat exchanger of claim 13, wherein said overmolding insert is located within said manifold wall.

15. The heat exchanger of claim 13, wherein said overmolding insert is at least partially embedded within said manifold wall.

16. The heat exchanger of claim 13, wherein said side walls and said end walls each have a terminal segment located opposite to where said side walls and said end walls join to said first surface, and wherein said terminal segment is capable of being raised to a higher temperature upon being contacted with molten polymer than a remainder of said insert.

17. The heat exchanger of claim 13, wherein a portion of said hollow conduit is further covered by a mass of said manifold

material, extending into said partially closed space of said overmolding insert.

18. The heat exchanger of claim 13, wherein said hollow projection has a step having a greater perimeter than an outside perimeter of said hollow projection, said step having the same shape as said hollow projection.

19. The heat exchanger of claim 13, further comprising a mass of manifold material extending outwardly from an outer perimeter of said manifold and partially covering at least one of said hollow conduits.

20. The heat exchanger of claim 13, wherein said hollow conduits are coplanar and spaced along a longitudinal axis of said manifold to form a first row of hollow conduits.

21. The heat exchanger of claim 20, wherein at least one overmolding insert is fitted into a subplenum adapter insert, said subplenum adapter insert comprising:

a base having at least one opening in a first surface, said opening being in communication with a second surface opposite said first surface,

said insert further comprising two opposed side walls, each side wall being joined to said first surface, two opposed end

walls being joined to an opposite end of said first surface and extending from one side wall to the other side wall, such that the side walls, the end walls, and the first surface define a partially closed space,

with the proviso that said overmolding insert and said subplenum adapter insert define an enclosed chamber between them, wherein said enclosed chamber communicates with said internal space of said manifold through a plurality of first openings, and said enclosed chamber communicates with said hollow conduits through a plurality of second openings, and wherein said plurality of first openings have a smaller total area than said plurality of second openings.

22. The heat exchanger of claim 20, further comprising at least one additional row of coplanar hollow conduits parallel to and spaced from said first row of hollow conduits.

23. The heat exchanger of claim 13, wherein said manifold has a substantially square or substantially rectangular cross-section.

24. The heat exchanger of claim 13, wherein said hollow conduits have a substantially circular cross-section.

25. The heat exchanger of claim 13, wherein said manifold has a substantially circular cross-section.

26. The heat exchanger of claim 13, wherein said manifolds and said hollow conduits comprise a polymeric material.

27. The heat exchanger of claim 27, wherein said polymeric material is thermoplastic.

28. The heat exchanger of claim 13, wherein said manifolds comprise a glass fiber reinforced polymeric material.

29. The heat exchanger of claim 13, wherein said hollow conduits comprise a propylene copolymer.

30. The heat exchanger of claim 13, wherein a plurality of said hollow conduits are joined together through a web in a coplanar orientation.

31. The heat exchanger of claim 30, wherein a portion of said web located at an end has been removed to create a notch in which a mass of manifold material having a thickness which is at least equal to a thickness of a manifold wall is located after an overmolding process to form a manifold has been completed.

32. The heat exchanger of claim 30, wherein a portion of said web located at an end has been removed to create a hole in which a mass of manifold material is located after an overmolding process to form a manifold has been completed.

33. A process for manufacturing a heat exchanger manifold, comprising

a) providing an overmolding insert comprising a base having at least one opening in a first surface, said opening being in communication with a second surface opposite said first surface, said overmolding insert further comprising two opposed side walls, each side wall being joined to said first surface, two opposed end walls being joined to an opposite end of said first surface and extending from one side wall to the other side wall, such that the side walls, the end walls and the first surface define a partially closed space;

b) removably inserting a removable projection into said opening in a first surface of said overmolding insert such that the projection extends from said first surface and beyond said partially closed space,

c) fitting an end of a hollow conduit over said removable projection;

d) molding molten polymeric material over said overmolding insert and said hollow conduit end to form a manifold; and

e) removing said removable projection from said manifold.

34. The process of claim 33, wherein said removable projection is removably inserted into said opening, thereby forming a sub-assembly, prior to placing said sub-assembly into a mold.

35. A process for manufacturing a heat exchanger manifold, comprising

a) inserting at least one insert of claim 1 into a mold;

b) fitting at least one end of at least one hollow conduit over at least one hollow projection, and

c) molding molten polymeric material around said overmolding insert and said hollow conduit to form a manifold.

36. A process for manufacturing a heat exchanger manifold, comprising

a) connecting said hollow projection of the overmolding molding insert of claim 1 to an end of a hollow conduit, thereby forming a sub-assembly,

b) placing said sub-assembly in a mold, and

c) molding molten polymeric material around said overmolding insert and said hollow conduit.

37. A heat exchanger, comprising

a mat comprising a plurality of coplanar, hollow conduits connected to one another by a web,

a first manifold connected at one end of each hollow conduit,

a second manifold connected at the opposite end of each hollow conduit,

wherein at least one of said first and second manifolds has been made by an overmolding process in which the ends of each hollow conduit are overmolded to form said manifold, and

wherein a portion of said web located at an end of said web has been removed prior to overmolding said manifold to create a notch in which a mass of manifold material having a thickness at least equal to a thickness of a manifold wall is located after said overmolding process is completed.

38. A heat exchanger, comprising

a mat comprising a plurality of coplanar, hollow conduits connected to one another by a web,

a first manifold connected at one end of each hollow conduit,

a second manifold connected at the opposite end of each hollow conduit,

wherein at least one of said first and second manifolds has been made by an overmolding process in which the ends of each hollow conduit are overmolded to form said manifold, and

wherein a portion of said web located at an end of said web has been removed prior to overmolding said manifold to create a

hole in which a mass of manifold material is located after said overmolding process is completed.